Certified Life Science Analytical Specialist

2-6 October 2017 | 9am – 5pm

Agro-Biotech Institute (ABI), Serdang, Malaysia

SYNOPSIS

Under the pressure of time and results delivery, chromatographers usually wished that critical analytical methods such as HPLC/GC are more logical and methodical both for development and troubleshooting. Hence the objective of this course is to give the participants an insight into industry best practices on how to troubleshoot challenges with HPLC and GC in a systematic approach to develop robust and reproducible methods/results faster and less expensively. The benchmarking is done against the highly challenging Pharmaceutical compliance guidelines.

Attendees should have at least a basic analytical understanding and have at least 3 months of laboratory testing experience. Attendees with some involvement in developing new methods or troubleshooting analytical results on HPLC/GC would have a greater appreciation of the systematic approach introduced in this course.

Course Highlight

In this comprehensive practical workshop, you will be taken through an approach to systematic method development and troubleshooting to yield consistent results. This course starts with essential fundamentals of HPLC/GC theories of commonly-used HPLC/GC separation techniques and showing you how to define your testing objectives clearly in chromatographic terms such as resolution, run time, specificity, accuracy, precision, limit of detection, etc. Techniques to troubleshoot common challenges with HPLC/GC results would also be shared. Lastly, the correct equipment maintenance method will also be explored.

What You Will Learn

- Principles and fundamentals of HPLC/GC
- The differing types of chromatography
- Choices of detectors
- Practical HPLC/GC Instrumentation
- Applications in pharmaceutical testing
- Method development and validation
- Testing issues troubleshooting
- Equipment maintenance

Who Should Attend

Laboratory technical specialists and chemists who are involved in laboratory testing of critical samples.

This course is also applicable to a broad audience from various industries who need to have strong basic understanding of the various concepts, terms and technologies of the HPLC/GC and wished to have more understanding of method development, validation and testing.

Prerequisite

Interest in analytical and desire to acquire better conceptual understanding in this area with some laboratory testing experience. Technical background in Science at Diploma or Degree level would be desirable.

Course Methodology

The participants are first taught the theories in classroom setting. The concepts are then re-enforced through practical exercises and examples of how the theories are applied in laboratory settings. Demonstration and practice on instruments and various equipment settings will be carried out to illustrate various principles and techniques.

Course Structure

1) The Principles	2) The fundamentals behind HPLC Techniques	3) General Scheme and Components of HPLC	4) Types of HPLC	5) Principal Detectors
• What is Chromatography? • Origin of HPLC	• The pressure • The ionic charges of the mobile phase • The characteristics of the stationary phase, in this case, size does matter • The analyte mixture	• Key components to the equipment • Compare and contrast features of different brands and the principles exploited	• Partition chromatography • Normal-phase chromatography • Displacement chromatography • Reversed-phase chromatography (RPC) • Size-exclusion chromatography • Ion-exchange chromatography • Bioaffinity chromatography • Aqueous normal-phase chromatography	• Photo Diode Array UV-Vis Detector • Variable wavelength UV-Vis Detector • Programmable variable wavelength detector
6) Other Detectors	**7) Selection of Detectors**	**8) Separation Mode and column chemistry**	**9) HPLC Test**	**10) Implications of Analytical and Preparative HPLC**
• Refractive Index Indicator • Programmable Scanning Flourescence Detector • Electrochemical Detector • Mass spectrometer	• Nature of compound • Flexibility of detection system • Cost • Decision tree	• Length of column • Internal diameter • Particle size • Pore size • Types of packing materials that is commercially available • Isocratic flow and gradient elution • Mobile phase composition • Pump pressure and pulsation • Electronics	• Qualitative and Quantitative application • Setting up a testing method • Validation of test method • Case study to see how to improve a poorly validated test method	• Sampling technique and sample size • Sample preparation • Pre-column • Run parameters, its impact when varied • Maintenance

11) Analyzing results	12) HPLC applications	13) Trends of HPLC	14) Background of GC	15) General Scheme and Component of GC
• Linear dynamic range • Flow cell sensitivity • Signal to noise ratio --- what is acceptable • Baseline stability • Noise and drift • Band broadening • effect of filter time constant • wavelength accuracy test	• Common industrial applications • Emerging applications	• Higher pressure UPLC • Green technology --- minimal solvent, replacing column with chip • Hyphenated technology	• Origin of GC • Basic Theory of Chromatography • Principles/Fundamental of GC Techniques	• Autosamplers --- Liquid, Static head-space by syringe technology, Dynamic head-space by transfer-line technology, Solid phase microextraction (SPME) • Inlets --- S/SL (Split/Splitless) injector, 聽 On-column inlet; PTV injector, Gas source inlet or gas switching valve, P/T (Purge-and-Trap) system • Choice of carrier gas
16) Principal Detectors	**17) Other Detectors**	**18) Selection of Detectors**	**19) Understanding the Challenges of Operations of GC**	**20) GC Application**
• Flame ionization detector (FID) • Thermal conductivity detector (TCD)	• catalytic combustion detector (CCD) • discharge ionization detector (DID) • dry electrolytic conductivity detector (DELCD) • electron capture detector (ECD) • flame photometric detector (FPD) • Hall electrolytic conductivity detector (ElCD) • helium ionization detector (HID) • nitrogen phosphorus detector (NPD) • infrared detector (IRD) • mass selective detector (MSD) • photo-ionization detector (PID) • pulsed discharge ionization detector (PDD) • thermal energy(conductivity) analyzer/detector (TEA/TCD) • thermionic ionization detector (TID) • mass spectrometrometer (MS)	• Nature of compound • Flexibility of detection system • Cost	• Carrier gas selection and flow rates • Stationary compound selection • Inlet types and flow rates • Sample size and injection technique • Sample injection • Column selection • Column temperature and temperature program • Run parameters, its impact when varied • Maintenance	• Key industrial applications • Implications of modern GC to Pharmaceutical/Neutraceutical Industry • Trends of GC

Course Instructor

Tan Hwee Sian

Tan Hwee Sian has more than 25 years of industry experience from analytical labs and manufacturing. She took on various roles as R&D Lab management, Customer service support, trainer and technical consultant through her career.

Technical Experience :
1) Polymer R&D Analytical Lab (2 years) - The Polyolefins Company
a) Took care of the R&D Analytical Lab and team of analysts for method development and optimisation of related products and additives
b) Provide Customers service and processing plant support for product investigations
c) EHS and Safety Committee - Monthly testing and Monitoring of environmental pollutants relating to polymers processing and site discharge and reporting to NEA

Instruments experience & knowledge :
i) Shimadzu GC, LC/GPC
ii) Waters High Temperature GPC
iii) Laboratory Testing Apparatus - Ashing, Karl Fisher moisture testing, particle sizing
iv) Materials testing apparatus - tensile strength, melt index, moulding and film, XRF

2) Feed additives R&D and Manufacturing (5 years) - Kemin Industries Asia
a) Pioneer in the first Asia Laboratory Operations Setup to provide Applied R&D, QAQC and Customers service Lab services to customers in Asia Pacific regions
b) Supported the Company full products ranging from feed preservatives, natural colourants, feed flavours and enzymes
c) Lead the company Lab safety policies and EHS related matters

Instruments experience & knowledge:
i) HP/Agilent GC
ii) Waters HPLC
iii) UV/Vis Spectrophotometer and colourimeter
iv) Laboratory Wet Lab Tests and Apparatus - Column Chromatography, particle sizing
v) Mould culture and identification
vi) Laboratory setup and EHS safety

3) Instrument Sales and Services (21 years) - HP/Agilent Technologies
a) Customer Education Trainer - GC, HPLC and GCMS
b) Pre- and post-sales Support for customers in various industries except big molecules like proteins/peptides and Life Science Instruments (Bioanalyzer/Micorarrays)
c) HP/Agilent Laboratory design and setup with EHS requirements in the Asia Pacific regions
d) Lead the company Lab safety procedures and EHS related matters

Instruments experience & knowledge:
i) All HP/Agilent Chromatographs - GC, HPLC and GCMS
ii) Chemical Analysis Sectors- Polymers, Food safety, Food Analysis, Forensics,
iii) Pharmaceuticals

dream CATCHER